IN THE CLAIMS

1. (Canceled).

2. (Previously Presented) The sensor of Claim 16, wherein the sol comprises a metal alkoxide or a metalorganic compound.

3. (Previously Presented) The sensor of Claim 16, wherein the sol comprises an alkoxy silane.

4. (Previously Presented) The sensor of Claim 16, wherein the sol comprises tetramethyl orthosilicate (TMOS).

5. (Previously Presented) The sensor of Claim 16, wherein the diazotizing reagent is sulfanilamide (SFA).

6. (Previously Presented) The sensor of Claim 16, wherein the coupling reagent is N,N-dimethyl-1-naphthylamine (DMNA).

7. (Previously Presented) The sensor of Claim 16, wherein the method for making the nitrogen oxide sensing element further comprises transferring the sol into the cavity of a mold and allowing the sol to gel in the mold.

8. (Previously Presented) The sensor of Claim 7, wherein the mold is a tube and wherein the cavity of the mold is the hollow interior of the tube.

9. (Previously Presented) The sensor of Claim 16, wherein the sol is formed into a film.

10. (Previously Presented) The sensor of Claim 16, wherein the sensing element comprises equal molar proportions of diazotizing reagent and coupling reagent.

11. (Previously Presented) The sensor of Claim 7, wherein the tube comprises polytetrafluorethylene (PTFE).

12 - 15. (Canceled).

16. (Previously Presented) A nitrogen oxide sensor comprising:

a nitrogen oxide sensing element made by a method comprising:

incorporating a diazotizing reagent which reacts with nitrous ions to produce a diazo compound and a coupling reagent which couples with the diazo compound to produce an azo dye into a sol; and

allowing the sol to gel;

wherein the gel comprises a microporous optically transparent inorganic matrix comprising immobilized diazotizing reagent and immobilized coupling reagent;

a light source; and

an optical detector;

wherein the sensing element is coupled to the light source by one or more transmitting optical fibers and wherein the sensing element is coupled to the detector by one or more receiving optical fibers such that light from the light source is transmitted through the one or more transmitting optical fibers and impinges on the sensing element and light impinging on the sensing element is transmitted through the one or more receiving optical fibers to the detector;

wherein the sensing element is in the form of a film;

wherein ends of the transmitting and receiving fibers adjacent the sensing element are bundled into an optical fiber cable having a planar cable end adjacent the sensing element, and wherein the planar surface of the film sensing element is oriented at an angle to the planar cable end adjacent the sensing element; and

wherein the angle of orientation of the film sensing element to the planar cable end is the Brewster's angle (β_B) as calculated from the refractive index of the sensing element

(n_2) and the refractive index of the medium through which the light travels before impinging on the sensing element (n_1) as set forth below:

$$\beta_B = \arctan\left(\frac{n_2}{n_1}\right).$$

17. (Previously Presented) The sensor of Claim 16, wherein the transmitting and receiving optical fibers are combined in the form of a Y-shaped optical cable having a single distal end comprising ends of both transmitting and receiving fibers, a first proximal end comprising the ends of one or more transmitting fibers and a second proximal end comprising the ends of one or more receiving fibers;

wherein the distal end of the Y-shaped optical cable is placed in optical communication with the sensing element;

wherein the first proximal end of the Y-shaped optical cable is placed in optical communication with the light source; and

wherein the second proximal end of the Y-shaped optical cable is placed in optical communication with the detector.

18. (Previously Presented) The sensor of Claim 17, wherein the optical cable comprises a single transmitting fiber and a plurality of receiving fibers.

19. (Previously Presented) The sensor of Claim 18, wherein the single transmitting fiber is surrounded by the plurality of receiving fibers at the distal end of the optical fiber cable.

20. (Previously Presented) The sensor of Claim 18, wherein the optical cable comprises six receiving fibers.

21-30. (Canceled).

31. (Previously Presented) The sensor of Claim 16, wherein the light source has a spectral distribution ranging from 250 nm to 870 nm.

32. (Previously Presented) The sensor of Claim 16, wherein the detector is a spectrometer.

33. (Previously Presented) The sensor of Claim 32, wherein the spectrometer comprises a grating and a CCD, wherein light transmitted from the sensing element to the detector passes through the grating and impinges on the CCD.

34. (Previously Presented) The sensor of Claim 16, further comprising a personal computer interfaced to the detector for collecting data.

35-40. (Canceled).

41. (Previously Presented) A nitrogen oxide sensor comprising:

a film sensing element comprising a microporous matrix of an optically transparent material, a diazotizing reagent which reacts with nitrous ions to produce a diazo compound and a coupling reagent which couples with the diazo compound to produce an azo dye;

a light source; and

an optical detector;

wherein the sensing element is coupled to the light source by one or more transmitting optical fibers and wherein the sensing element is coupled to the detector by one or more receiving optical fibers such that light from the light source is transmitted through the one or more transmitting optical fibers and impinges on the sensing element and light impinging on the sensing element is transmitted through the one or more receiving optical fibers to the detector;

wherein ends of the transmitting and receiving fibers adjacent the sensing element are positioned on the same side of the film sensing element;

wherein the film sensing element is positioned such that light impinging on the sensing element is reflected by the sensing element into one or more receiving fiber ends;

wherein ends of the transmitting and receiving fibers adjacent the sensing element are bundled into an optical fiber cable having a planar cable end adjacent the film sensing element, and wherein the planar surface of the film sensing element is oriented at an angle to the planar cable end adjacent the sensing element; and

wherein the angle of orientation of the film sensing element to the planar cable end is the Brewster's angle (β_B) as calculated from the refractive index of the sensing element (n_2) and the refractive index of a medium through which the light travels before impinging on the sensing element (n_1) as set forth below:

$$\beta_B = \arctan\left(\frac{n_2}{n_1}\right).$$

42 - 43. (Canceled).

44. (Previously Presented) The sensor of Claim 41, wherein the sensor does not comprise a mirror.

45-46. (Canceled).